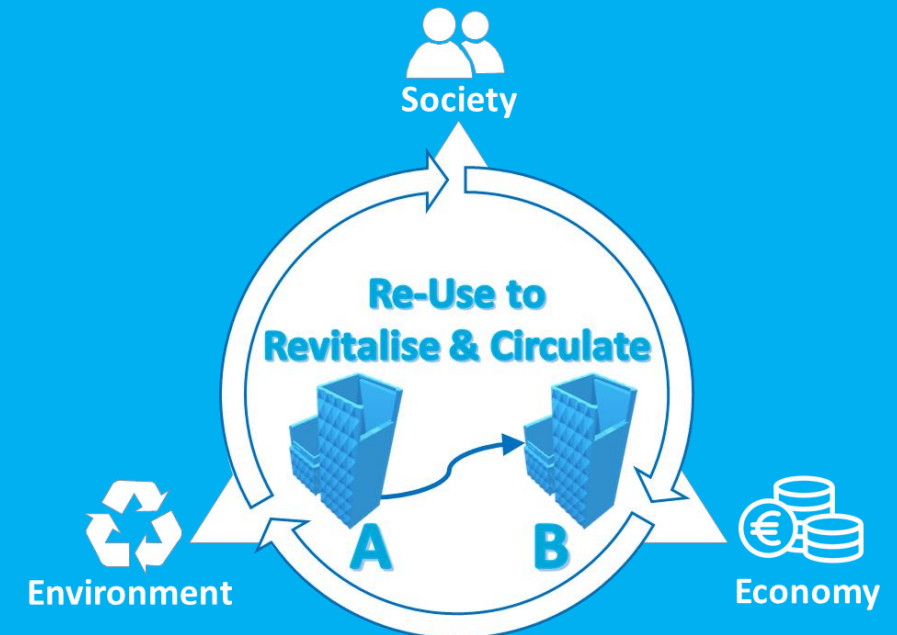


# Rethinking of the Built Environment Adaptability within the Context of Circularity: A Conceptual Incorporation

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# Outline

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**1. Introduction**

**2. Research Methodology**

**3. Preliminary Findings**

**4. Conclusion and Future Plan**

# 1. Introduction

- Rapid urbanization has stimulated the demand for built environment, and thus, accelerated the use of primary resources.
- This causes a degradation of the environmental sustainability.
- This kind of development lacks in adaptability to meet future demands and resource circularity.



CONSTRUCTION

10-15%  
of building material  
wasted during  
construction.

0-0.5%  
productivity increase per  
year in most European  
countries 1990-2015,  
whereas 2% per year  
achieved in some countries.



USING SPACE

35-40%  
of European offices  
are not used during  
working hours.

50%  
of residential dwellers  
report living in too  
much space.



USING ENERGY

20-40%  
of energy in existing  
buildings can be  
profitably conserved.

Passive building  
standards at or near  
profitability for most  
new-build segments,  
but still only constitute a  
minority of buildings.



END OF LIFE

54%  
of demolition materials  
landfilled, while some  
countries only landfill 6%.

Most materials  
unsuitable for reuse  
as they contain toxic  
elements.

**Source:** ARUP and Ellen MacArthur Foundation (2018). *“From Principles to Practices: First Steps towards a Circular Built Environment”*.

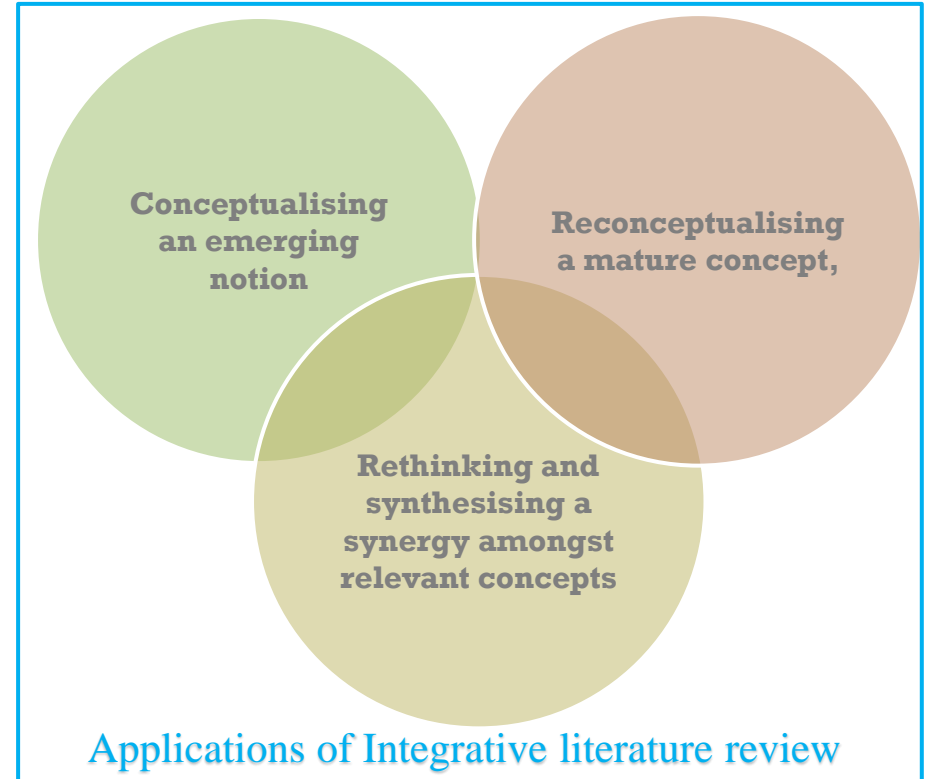
# 1. Introduction

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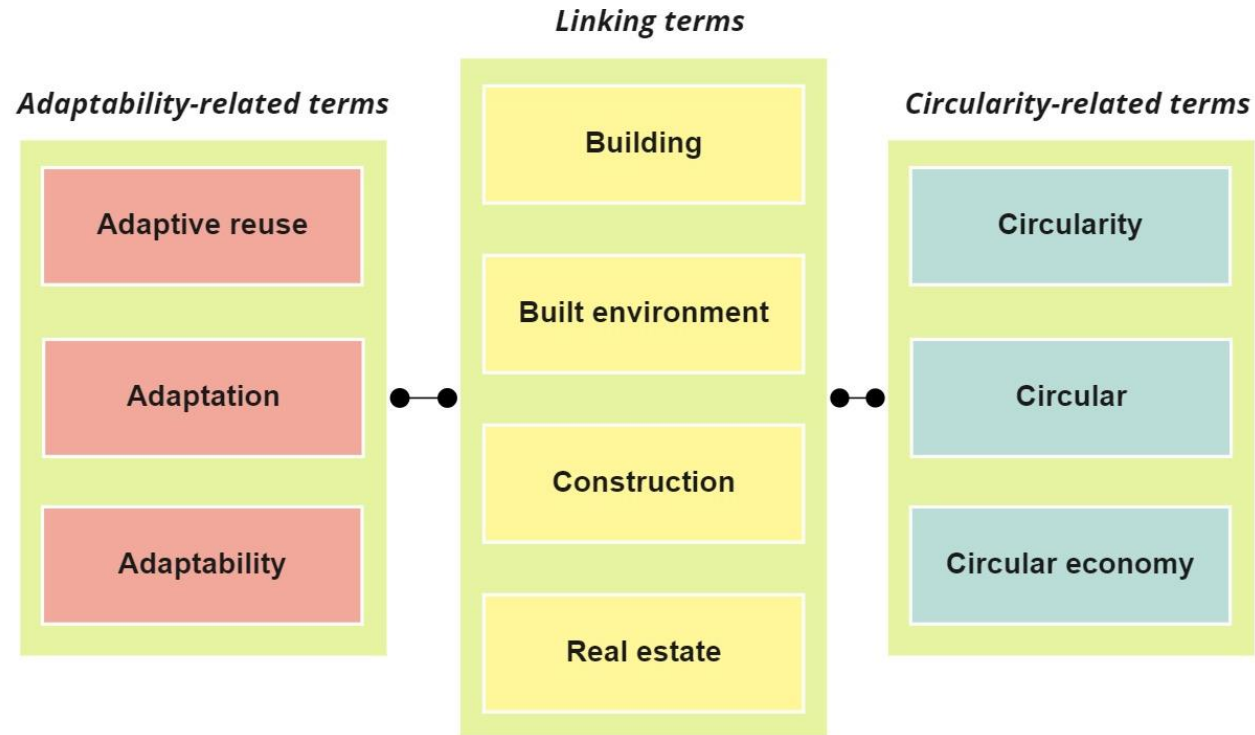
- Incorporating **adaptability** into the **circularity** paradigm contributes to closed material loops and mitigation of environmental impacts, **while** meeting demands and adding values for longer life.
- Although **circularity** and **adaptability** are interrelated concepts, there is a lack of a synergy between both notion, conceptually and pragmatically
- This research aims to respond to this gap by answering to the following question:  
*What are the determinants and strategies of built environment adaptability within the context of circulatory notion?*

## 2. Research Methodology – An overview

- An integrative literature review, using a systematic search, was followed as an approach for conceptualising the incorporation between the two notions.
- **Torraco's (2005)** guidelines for conducting an integrative literature review and **Moher's et al., (2015)** guidelines for systematic resource selection were followed.
- The search was conducted on two research engines, namely **Web of Science** and **Scopus** between March and May 2021.
- The reviewed sources comprised **peer-reviewed journal articles**, **conference papers** and **book series**, in addition to other literature sources.



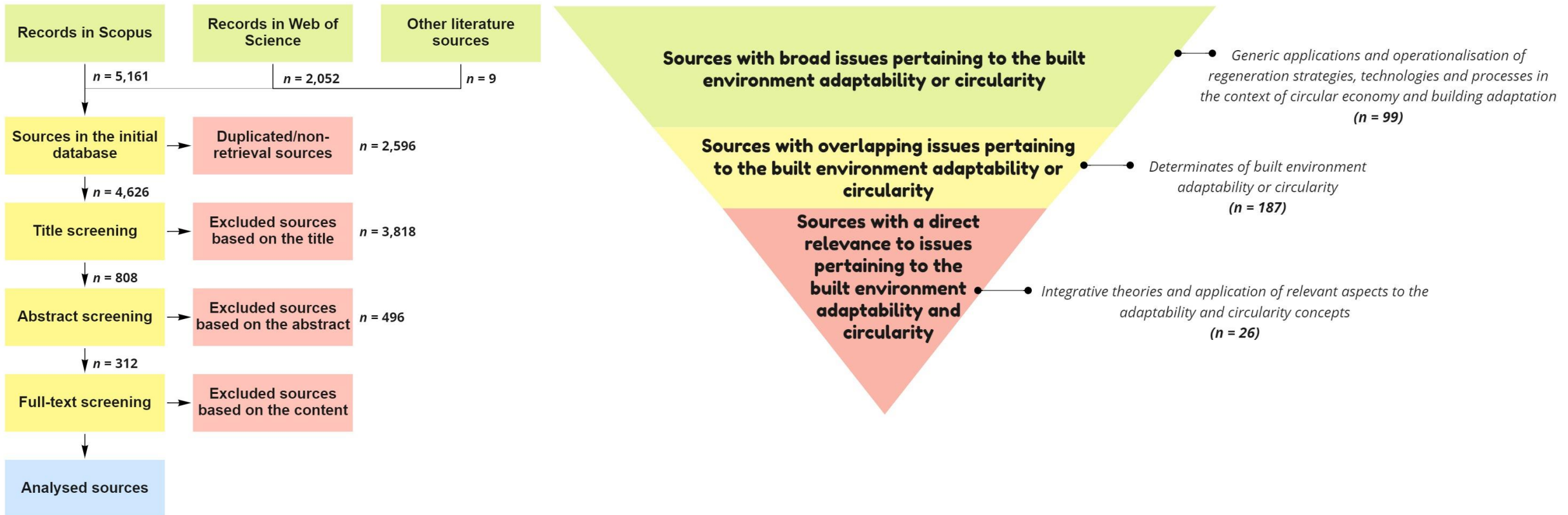
# 2. Research Methodology – Search Terms



# 2. Research Methodology - inclusion and exclusion criteria

Inclusion	Exclusion
<b>Type of sources:</b> Literature reviews, theoretical studies, empirical studies	<b>Type of sources:</b> Testing building material, systems or components, research methods in the built environment
<b>Adaptability variables:</b> Adaptable buildings, adaptability attributes, open/hybrid building design, built environment/building adaptability, adaptable strategies, fixable building design, adaptation strategies	<b>Adaptability variables:</b> Landscape adaptability, thermal adaptation, behavioral adaptation, climate change adaptation, urban economic adaptability
<b>Circularity variables:</b> Circular economy in the built environment, circular buildings, circular economy in construction	<b>Circularity variables:</b> Circularity and circular economy in cities, circular economy in product chain, organization/corporate circular economy, circular economy in food chains, circular economy measurements, circular design (geometry)
<b>Other variables:</b> Regeneration strategies, disassembly and reusability of building components	<b>Other variables:</b> Renovation processes, vernacular heritage, housing governance, material flow analysis
<b>Subject:</b> Sustainable building adaptation, building adaptive reuse potential, and circular economy operationalization in the built environment	<b>Subject:</b> Adaptation of user with the building environment – e.g. thermal, lighting, acoustical, communal adaptation, and circular economy measurements.

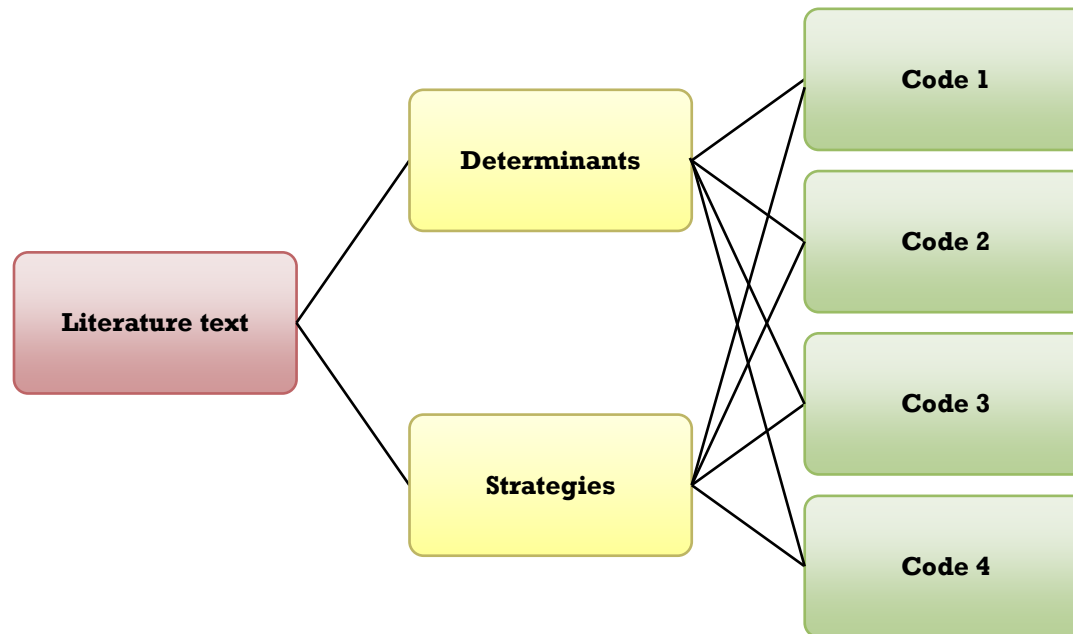
# 2. Research Methodology – Screening





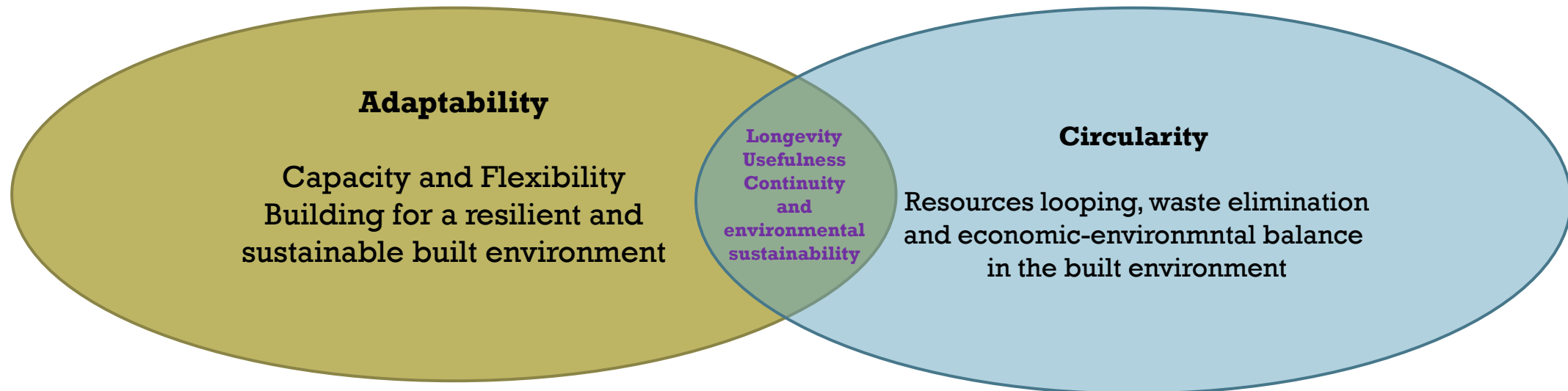
## 2. Research Methodology – Coding

- Inductive-driven coding is being conducted to systematically facilitate the labeling and categorization of the critical analysis and synthesis of the key interrelationships amongst the determinants and strategies of both concepts .



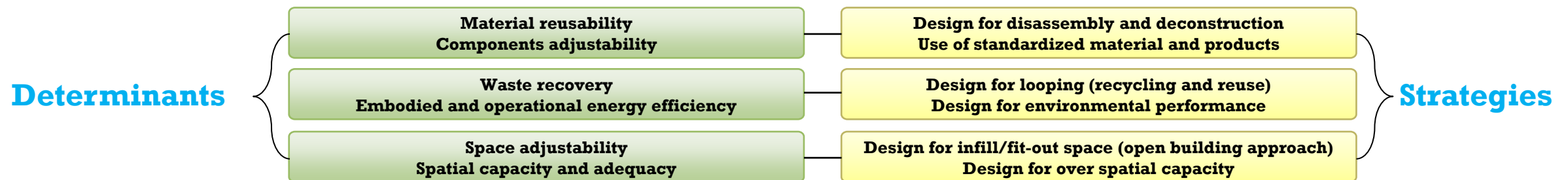
# 3. Findings – Interrelationship between Concepts

- Similarities - In terms of **interrelationship** between the two concepts, it is noted that adaptability and circularity shares the principle of **longevity, usefulness, continuity** and **environmental sustainability** of the physical assets and processes.
- Deferences - In contrasts, adaptability is more concerned with capacity building and flexibility provision, while circularity concerned with **the resources looping, waste elimination** and **economic-environmental balance**.



# 4. Findings – Preliminary Observations

- There is no a common term used to pragmatically and conceptually express *components* of both concepts – e.g. **determinants**, criteria, factors, indicators and attributes.
- There is no a common term used to pragmatically and contextually express *methodological ways* or *mechanisms* to fulfill the principles of both concepts – e.g. **strategies**, techniques, methods and approaches.
- The term “**determinants**” can comprise and contextualise constraints and attributes of building-related considerations (*object related aspects*) and non-building-related considerations (*context related aspects*).
- The term “**strategies**” can generally comprise *instrumental tools, methodological approaches* and *actions* to achieve **predefined quality**.



# 5. Conclusion and Future Plan

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- Both concepts, synergic contextualisation and application of circularity and adaptability are **crucial** for waste elimination, climate change mitigation, value addition, and capacity and flexibility building for future demands.
- The initially identified determinants and strategies are part of a PhD research that focuses on conceptualizing and operationalising a framework for circular building adaptation as a means for revitalising vacant properties in the rapidly growing cities during the market dynamics and the other socio-economic changes.

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# Thank You

